

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau(43) International Publication Date
29 April 2004 (29.04.2004)

PCT

(10) International Publication Number
WO 2004/035989 A1(51) International Patent Classification⁷: **E21B 47/18,**
34/10, 47/01(21) International Application Number:
PCT/CA2003/001593

(22) International Filing Date: 17 October 2003 (17.10.2003)

(25) Filing Language: English

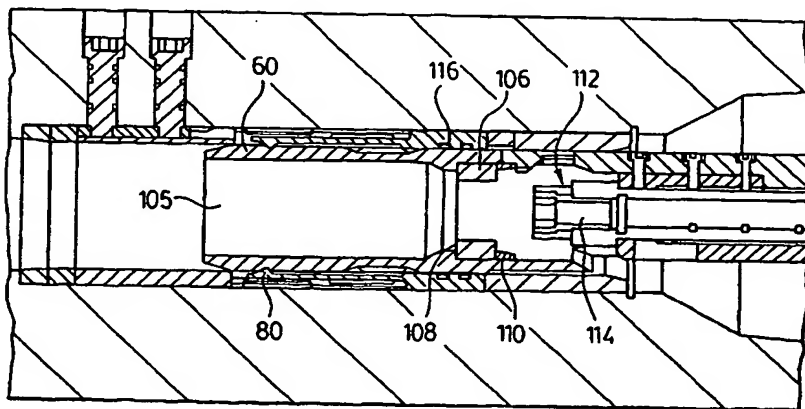
(26) Publication Language: English

(30) Priority Data:
2,408,868 18 October 2002 (18.10.2002) CA(71) Applicant (for all designated States except US): **RYAN
ENERGY TECHNOLOGIES** [CA/CA]; 2719 - 61st Av-
enue S.E., Calgary, Alberta T2C 4X3 (CA).

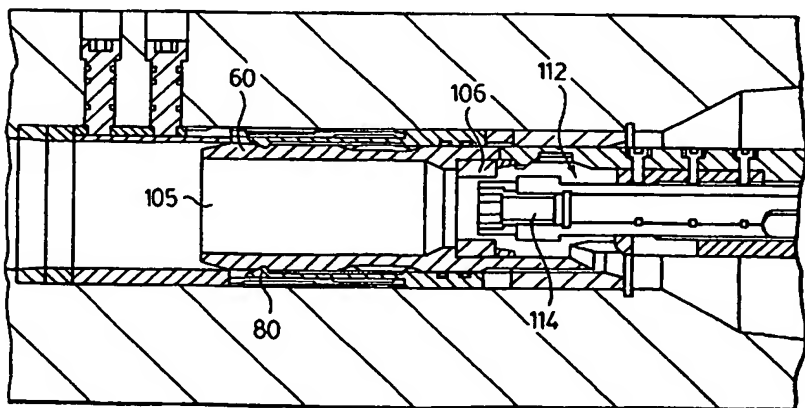
(72) Inventors; and

(75) Inventors/Applicants (for US only): **SIM, David, F.**[CA/CA]; 623 Wilderness Drive S.L., Calgary, Alberta
T2J 1Z4 (CA). **SUTHERLAND, Michael, T.** [CA/CA];
133 Douglas Glen Manor S.E., Calgary, Alberta T2Z 3Y5
(CA).(74) Agent: **WOODLEY, John, H.;** Sim & McBurndey, 330
University Avenue, 6th Floor, Toronto, Ontario M5G 1R7
(CA).(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT,
RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: **MUD PULSE LANDING ASSEMBLY FOR USE IN DIRECTIONAL DRILLING**

A



B

(57) **Abstract:** A mud pulse landing assembly (10) which allows for the removal of the mud pulse generator (16) containing the mud pulse orifice (106), thus creating an unobstructed passageway for any tool or instrumentation that may need to be passed through the drill string. The retainer (14) of the mud pulse landing assembly also provides a universal mount for engaging alternate tools or instrumentation for use in analyzing the borehole geology. The retainer (14) is positioned between the mud pulse generator (16) and the landing sub body, so as to protect the retainer from the turbulent and abrasive mud flow, and to prevent obstruction of the area downstream of the compact muleshoe (60).